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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/597,514

07/27/2006

Youhei Sakai

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73230 7590 07/20/2011

DLA PIPER US LLP
1999 AVENUE OF THE STARS
SUITE 400
LOS ANGELES, CA 90067-6023

EXAMINER

MALEKZADEH, SEYED MASOUD

ART UNIT

PAPER NUMBER

1743

NOTIFICATION DATE

DELIVERY MODE

07/20/2011

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/597,514	SAKAI ET AL.	
	Examiner	Art Unit	
	SEYED M. MALEKZADEH	1743	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 March 2011.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 18,20,21,23 and 26-38 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 18,20,21,23 and 26-38 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 July 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 03/30/2011 has been entered.

Response to Amendment

Claims **1-17, 19, 22, 24-25 and 35** are **cancelled**.

Claims **18, 20-21, 23, 26-34, and 36-38** stands **rejected**.

In view of the amendment, filed on 03/30/2011, following **rejections are withdrawn** from the previous office action for the reason of record.

- Rejection of claims 18, 20, 23, 28-34, and 36-38 under 35 U.S.C. 102(b) as being anticipated by Bate (US 3,165,798)
- Rejection of claim 21 under 35 U.S.C. 103(a) as being unpatentable over Bate (US 3,165,798)
- Rejection of claims 26-27 under 35 U.S.C. 103(a) as being unpatentable over Bate (US 3,165,798)

New Grounds of the Rejections

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary

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skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 18, 20-21, 23, 28-34, and 36-38 are rejected under 35 U.S.C.

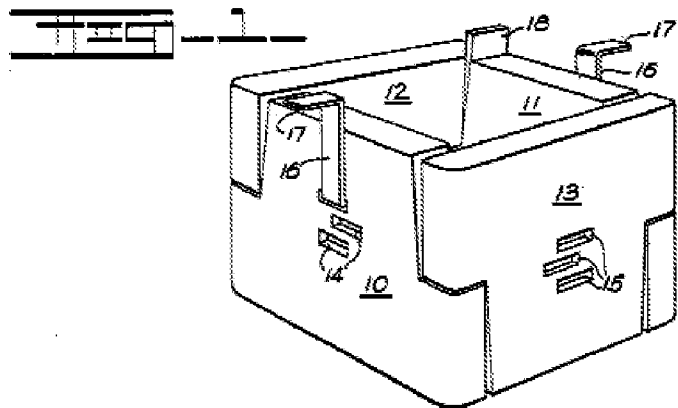
103(a) as being unpatentable over Bate (US 3,165,798) in view of Kempton (US 1,386,003)

Bate (US '798) discloses a hot top mold structure comprising two oppositely disposed identical side portions (10 and 11), a pair of oppositely disposed identical end portions (12 and 13) wherein the end portions (10 and 11) and the side portions (12 and 13) each have a series of vertically spaced recesses (14 and 15) in their outermost surfaces and which recesses are adapted to receive the lower ends of a supporting hanger crank (16). Further, the upper ends of the hanger cranks (16) are outturned as at (17) and adapted to overlie the upper most surface of an ingot mold (M). The sections (10 and 11) of the ingot mold are wider in their lower half portions than at their upper half and conversely the sections (12 and 13) are wider at their upper half than at their lower half so that the sections (12 and 13) may be positioned on and held in elevated relation in an ingot mold by the lower sections of the portions (10

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and 11) of the ingot mold which are in turn suspended by the hanger cranks (16). (See column 2, lines 44- 64 and figures 1- 5)

Furthermore, Bate (US '798) teaches the V-shaped narrow openings provided between the ends of the portions (10 and 11) and the backs of the adjacent portions (12 and 13) and which V-shaped openings are particularly receptive to wedge members (18). (See column 2, lines 68-72)



Therefore, as to **claim 18**, Bate (US '798) teaches a mold for producing an ingot comprising a bottom surface member at the end portion of the mold (M) and a plurality of lateral surface members (10-13) combining with the bottom surface member in which each of the lateral surface members comprising a first engaging structure and a second engaging structure on a second lateral end thereof in which one of the first and second engaging structure of one of the plurality of lateral surface members engages with one of the first and second engaging structures of another one of the plurality of lateral surfaces in such a way that the first and second engaging structures each comprises a projection and a recess wherein the plurality of lateral

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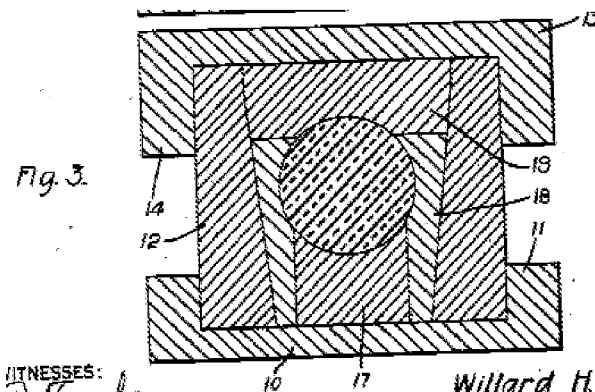
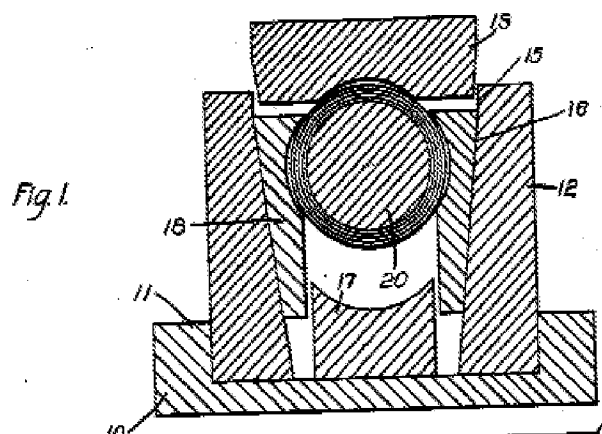
surface members (10-13) combined with a side surface of the bottom surface member and are upright so as to surround the bottom surface member and a mold holder (M) is configured for placing the bottom surface member and the plurality of lateral surface members (10-13) that are combined, a wedge receiver is on an upper surface of the mold holder between the mold wall (M) and the lateral surface members (10-13) and a plurality of wedge members (17) respectively are positioned in clearance (14 and 15) between the wedged receiver and outer peripheral surfaces of the plurality of lateral surface members.

However, Bate (US '798) **fail to teach** the mold holder is independent from the bottom surface member, as claimed in **claim 18**.

In the analogous art, Kempton (US '003) teach a molding apparatus comprising a bottom plate (10) having upstanding marginal flanges (11) between which are disposed side-walls (12) the lower edges of which rest upon the upper face of the plate and bear against the flanges A top or pressure plate (13) forms a closure for the mold and is provided with depending marginal flanges (14) which engage against the outer faces of the sidewalls for a short distance are vertically disposed as indicated at (15) while the remainder of the inner faces of the sidewalls are inwardly and downwardly inclined as indicated at (16). Cooperating with the mold body is a stationary bottom split or forming member (17) which is disposed upon the bottom plate of the mold midway

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between the sidewalls, side wedging split or forming member (18) and a top split or forming member (19). (See first page, lines 78-109 and figures 1-2)



Therefore, as to **claim 18**, Kempton (US '003) teach a mold holder (10) configured for placing the bottom surface member (17) and the plurality of lateral surface members (12) that are combined in which the mold holder (10) is provided independently from the bottom surface member (17).

It would have been obvious for one of ordinary skill in the art at the time of applicant's invention to modify the molding apparatus as taught by Bate (US '798) through **providing** a mold holder independent from the bottom surface member of the mold **in order to** improve the workability of the molding device by increasing the efficiency of the molding apparatus being able to adapt with the changing the production line, as suggested by Kempton (US '003)

As to **claim 20**, Bate (US '798) teaches the number of plurality of lateral surface members combining with the bottom surface member is four. Also, as to **claim 23**, the shapes of the engaging structures are in a point-symmetrical relationship with each other and with respect to a center point of the lateral

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surface member and the wedge receiver is removable from the upper surface of the mold holder, as to **claim 26**.

Further, as to **claims 28- 29**, Bate (US '798) teaches a frame-shaped member which continuously surrounds an outer periphery of the plurality of lateral surface members integrated by engaging with each other, with a free space between the frame shaped and the plurality of lateral surface members and a plurality of pressing jigs (18) respectively arranged in clearances between the frame-shaped member and outer corners formed by the lateral surface members (10-13) adjacent to each other and is configured for constraining displacement of the plurality of lateral surface members. Further

Moreover, as to **claim 30**, Bate (US '798) discloses one of the plurality of pressing jigs (18) has two jig surfaces respectively with outer peripheral surfaces of two of the plurality of lateral surface members (10-13) and the outer peripheral surfaces form the outer corner of the mold for producing a silicon ingot.

Furthermore, as to **claim 31**, Bate (US '798) teaches the plurality of pressing jigs has a relief groove located corresponding to the outer corner of the mold so as not to directly contact with each other, and as to **claim 32**, the frame-shaped member has a projection in an inner periphery thereof, the projection contacts with the lateral surface member facing therewith for constraining displacement of the plurality of lateral surface members. Also, as to **claim 33**, the engaging structures comprises engaging surfaces that are

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level with the bottom surface of the bottom surface member and the frame-shaped members are arranged at positions of engaging surfaces.

Moreover, as to **claim 34**, Bate (US '798) teaches a mold release material is applied to a mold inner surface comprising a bottom surface member and the lateral surface member and locking sections formed by the bottom surface member and the lateral surface members (2 and 3).

As to **claim 36**, Bate (US '798) teach a step of producing a silicon ingot using the mold and a step of obtaining a polycrystalline silicon substrate from the silicon ingot.

Furthermore, as to **claim 37**, Bate (US '798) teach the projection and the recess are aligned along the lateral end of the lateral surface members (10-13) wherein the projection and the recess of each of the first and second engaging structures are arranged in a lengthwise direction of the lateral surface member.

Further, the combined teachings of Bate (US '798) and Kempton (US '003) teach each of the engaging structures comprises one or more engaging surfaces that are substantially level with a bottom surface of the bottom surface member, **however**, are **silent** that a distance between an upper side of the lateral surface member and the engaging surface closest to the upper side is in a range of not less than 1 cm nor more than 8 cm, as claimed in **claim 21**. **It would have been obvious** that claiming of a structural property which is not described and is inherently present in the prior art does not necessarily make the claim patentable, In re Best, 562 F.2d 1252, 1254, 195 USPQ 430,

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433 (CCPA 1977). **Thus**, it is within the level of ordinary skill in the art to arrange the lateral surface members in such a way that the engaging surface closest to the upper side is in a range of not less than 1 cm nor more than 8 cm.

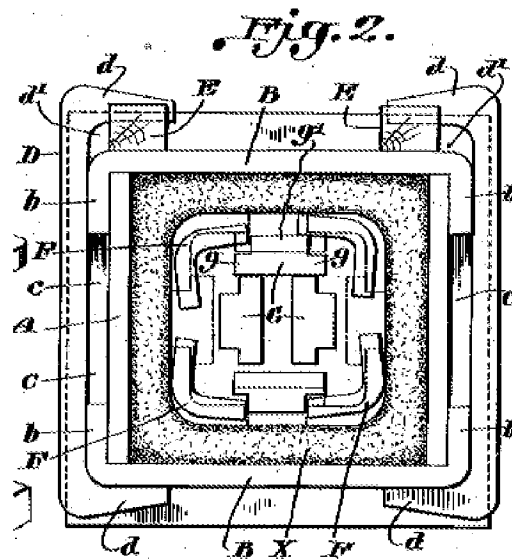
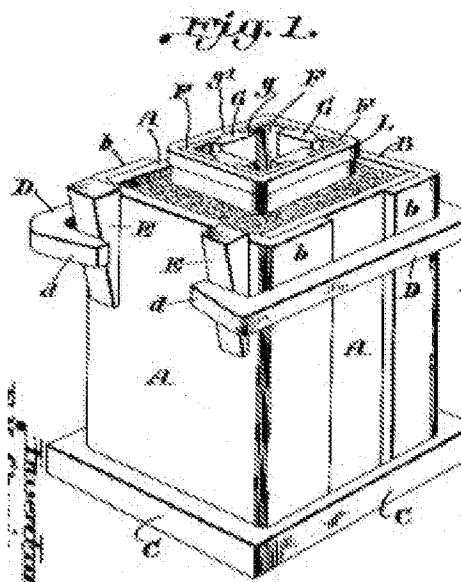
Claims 26- 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bate (US 3,165,798) in view of Kempton (US '003) and further in view of Chapin (US 1,572,707)

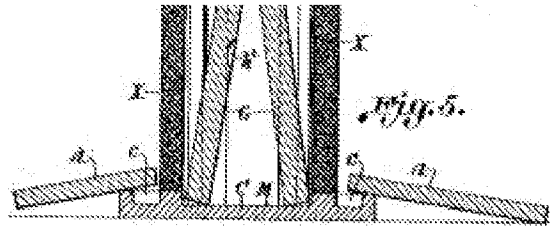
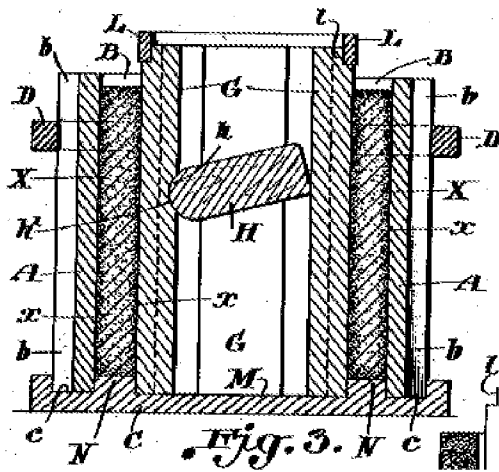
The combined teachings of Bate (US '798) and Kempton (US '003) teach all the structural limitations of a mold apparatus for producing ingots as discussed above in rejection of the claims 18, 20-21, 23, 28- 34, and 36- 38, however, **fail to teach** a plurality of removable wedge receivers which are also adjustable, as claimed in claims 26- 27.

In the analogous art, Chapin (US '707) teaches a molding apparatus for casting the ingots comprising two similar members (A) and two similar members (B) in which the members (A) are of a general rectangular shape being of the same width and height. The members (B) are of the same size and shape and each of these members (B) has an inwardly projecting flange (b) at each end. The lower ends of the members (A and B) are seated in a bottom member (C) provided with a recess (c) extending continuously around the inner side of the bottom member. The lower ends of the members (A and B) closely fit within the recess (c) in such a manner that they can not be moved laterally in either direction. These recesses are wide enough to accommodate not only the lower

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ends of the members (B) including the flanges (b), but also the lower ends of the members (A). In order to hold the outer walls of the mold firmly in place, a plurality of locking bars (D) which have at opposite ends arms (d) which overlap the end portions of the members (A). The distance between the two arms of each locking bar is such as to provide a space (d') to receive a wedge (E). When the wall members (A) are placed in proper position and the locking bars (D) are applied, the wedges are in such a manner as to securely lock the members (A) in operative position. (See page 2, left column, and lines 1- 28; figures 1-2)





Therefore, as to **claim 26**, Chapin (US '707) teaches the wedge receivers (D) are removable from the upper surface of the mold holder, and as to **claim 27**, a plurality of wedge receivers (D) exists and a space between one of the plurality of wedge receivers (D) and another one wedge receiver is arranged at a position opposed to the one of the wedge receivers with the bottom surface member and the plurality of lateral surface members that are combined therebetween.

Therefore, **it would have been obvious** for one of ordinary skill in the art at the time of applicant's invention to modify the molding apparatus as taught by the combined teachings of Bate (US '798) and Kempton (US '003) through **providing** a plurality of removable wedge receivers (D) which are also adjustable **in order to** prevent the formation of the strains or stresses and consequent cracking or breaking of the manufactured product caused by constrains of the outer mold walls, as suggested by Chapin (US 1,572,707)

Response to Arguments

Applicant's **arguments** with respect to claims **18, 20- 21, 23, 26- 34, and 36- 38** have been considered but **are moot** in view of the new ground(s) of rejection.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Seyed M. Malekzadeh whose telephone number is (571)272-6215. The examiner can normally be reached on Monday to Friday 8:30 a.m. to 5:00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph S. Del Sole, can be reached on (571) 272-1130. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/S. M. M. /

Examiner, Art Unit 1743

/Joseph S. Del Sole/
Supervisory Patent Examiner, Art Unit 1743